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| 10/625,709 | 07/22/2003 | Sumito Nishioka | (70904) 59628 | 8383 |
| 21874 | 7590 | 06/30/2006 | EXAMINER | |
| EDWARDS & ANGELL, LLP P.O. BOX 55874 BOSTON, MA 02205 | | | LAMB, CHRISTOPHER RAY | |
| | | ART UNIT | PAPER NUMBER | |
| | | 2627 | | |

DATE MAILED: 06/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | |
|------------------------------|---------------------------------|------------------|
| Office Action Summary | Application No. | Applicant(s) |
| | 10/625,709 | NISHIOKA ET AL. |
| | Examiner Christopher R. Lamb | Art Unit 2627 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 07 June 2006.
 2a) This action is **FINAL**. 2b) This action is non-final.
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-51 is/are pending in the application.
 4a) Of the above claim(s) 1-13, 16-20, 29-31 and 35-51 is/are withdrawn from consideration.
 5) Claim(s) _____ is/are allowed.
 6) Claim(s) 14, 15, 21-24, 27 and 28 is/are rejected.
 7) Claim(s) 25, 26 and 32-34 is/are objected to.
 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.
 10) The drawing(s) filed on 22 July 2003 is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

| | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date: _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>10/2/2003</u> . | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Election/Restrictions

2. Applicant's election without traverse of Species III in the reply filed on June 7th, 2006 is acknowledged.
3. Claims 1-4 and 49-51 withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim (the Examiner had previously indicated claims 1-2 and 49-51 as being generic claims; however, they require "the first and second light beams...to be incident on the diffraction optical element as parallel rays," which is clearly not the case in the figures of Species III).

Specification

4. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.
5. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Rejections - 35 USC § 112

6. Claims 27 and 28 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 27:

It fails to particularly point out the subject matter claimed because the term Φ_{inb} has not been defined in the claim.

Regarding claim 28:

It fails to particularly point out the subject matter claimed because the term \emptyset has not been defined in the claim (it was defined in claim 27, but claim 27 is not part of claim 28).

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 14-15 are rejected under 35 U.S.C. 102(e) as being anticipated by Ohtaki et al. (US 6,449,095; hereafter Ohtaki).

Regarding claim 14, Ohtaki discloses:

An optical pickup for recording or reproducing information with respect to a first recording medium having a light transmissive layer of a thickness t_1 on an information recording face (Fig. 5a),

the optical pickup recording or reproducing information by forming a first light spot on the information recording face by focusing a first light beam of a wavelength λ_1 on the information recording face (Fig. 5a),

said optical pickup comprising:

a diffraction optical element (Fig. 5a: 16b) including a diffracting face (column 6, lines 17-21) and a refracting face for diffracting and refracting the first light beam so as to emit the first light beam (column 6, lines 60-64; in Ohtaki, the diffracting face and refracting face are on the same surface of the element);

an objective lens (Fig. 5a: 16a) for causing a diffracted ray of a predetermined diffraction order of the first light beam emitted from the diffraction optical element to focus on the information recording face of the first recording medium so as to form the first light spot (column 6, lines 5-26); and

a collimator lens, provided between the first light source and the diffraction optical element, for causing the first light beam from the first light source to be incident on the diffraction optical element as a parallel ray (Fig. 1: 14; column 5, lines 19-31),

the diffracting face of the diffraction optical element having such a diffraction characteristic that the first light beam is diffracted toward an optical axis (not specifically described, but inherent), and the refracting face being a concave face (column 6, lines 61-64).

Regarding claim 15:

In Ohtaki the diffraction optical element satisfies

$$\Phi = \Phi_D + \Phi_L = 0$$

where Φ is a power of the diffraction optical element, Φ_D is a power of the diffracting face of the diffraction optical element, and Φ_L is a power of the refracting face of the diffraction optical element (this is inherent; all this equation says is that if the light enters as parallel light, it is emitted as parallel light, which is apparent in Ohtaki Fig. 5a).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shiono et al. (US 6,987,615; hereafter Shiono) in view of Katayama et al. (US 5,696,750; hereafter Katayama).

11. Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

Regarding claim 21:

Shiono discloses:

An optical pickup (Fig. 8) for recording or reproducing information with respect to a first and a second recording media having information recording faces and light transmissive layers (Fig. 8: 17a and 17b),

the light transmissive layers of the first and second recording media being formed on the respective information recording faces and respectively having thicknesses t_1 , and t_2 , which are related to one another by $t_1 < t_2$ (apparent in Fig. 8),

the optical pickup recording or reproducing information by focusing first and second light beams of wavelengths λ_1 and λ_2 , which are related to one another by $\lambda_1 < \lambda_2$, on the respective information recording faces (column 11, lines 52-67),

said optical pickup comprising:

an objective lens, movable in a substantially orthogonal direction with respect to respective optical axes of the first, and second light beams, for focusing the first and second light beams on the respective information recording faces of the first and second recording media (Fig. 8: 16); and

a diffraction optical element, provided on an incident side of the first and second light beams and movable with the objective lens (Fig. 8: 8e), for diffracting and refracting the first and second light beams so as to cause the first and second light beams to be incident on the objective lens as diffracted rays of predetermined diffraction orders (column 12, lines 4-17), said diffraction optical element causing the second light beam to be incident on the objective lens as diverging rays (clear from the dotted line, Fig. 8: 7), and said diffraction optical element satisfying

$$|\Phi_{inr}| < |\Phi_{outr}|$$

where Φ_{inr} is the degree of convergence and/or divergence of incident rays of the second light beam on the diffraction optical element, and Φ_{outr} is the degree of convergence and/or divergence of incident rays of the second light beam on the objective lens (in Shiono $\Phi_{inr}=0$, as the light comes in parallel, and although Shiono does not specify Φ_{outr} , it is clearly non-zero from the figure).

Shiono does not disclose:

A third media with thickness t_3 , and an associated third light beam of wavelength λ_3 , where $t_1 < t_2 < t_3$, $\lambda_1 < \lambda_2 < \lambda_3$, and $|\Phi_{inr}| < |\Phi_{outr}|$.

Katayama discloses a third media with thickness t_3 , and an associated third light beam of wavelength λ_3 , where $t_1 < t_2 < t_3$, $\lambda_1 < \lambda_2 < \lambda_3$, and $|\Phi_{inr}| < |\Phi_{outr}|$ (Fig. 1, column 3, lines 20-60; Shiono's optical head is for use with wavelengths of approximately 400 nm and 650 nm; Katayama's is for approximately 650 nm and 780 nm, so Katayama teaches a third media, and uses a diffraction element satisfying $|\Phi_{inr}| < |\Phi_{outr}|$ for that third media.)

It would have been obvious to one of ordinary skill in the art to include in Shiono the third media with thickness t_3 , and associated third light beam of wavelength λ_3 , where $t_1 < t_2 < t_3$, $\lambda_1 < \lambda_2 < \lambda_3$, and $|\Phi_{inr}| < |\Phi_{outr}|$, as taught by Katayama.

The motivation would have been to allow the apparatus of Shiono to read information from the third media (that is, CDs).

Regarding claim 22:

In Shiono the diffraction optical element causes the first light beam to be incident on the objective lens as a parallel ray (apparent from the solid line of Fig. 8).

12. Claims 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shiono in view of Katayama as applied to claim 21 above, and further in view of Ohtaki.

13. Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

Regarding claim 23:

Shiono in view of Katayama discloses an optical pickup as discussed above.

Shiono in view of Katayama discloses wherein the diffraction optical element causes the second and third light beams to be incident on the objective lens as a first order diffracted ray and a first order diffracted ray, respectively (Shiono discloses that the second beam is a first order ray in column 14, lines 24-37. Katayama teaches that the third beam is a first order ray in column 3, lines 50-60), the diffraction optical element having highest diffraction efficiency for the first order diffracted ray of the second light beam, and for the first order diffracted ray of the third light beam (inherent: as these are the read beams, they need to have the highest diffraction efficiencies).

Shiono in view of Katayama does not disclose:

Wherein the diffraction optical element causes the first beam to be incident on the objective lens as a second order diffracted ray, the diffraction optical element having highest diffraction efficiency for the second order diffracted ray of the first light beam (instead, in Shiono in view of Katayama, the first beam is a zero order diffracted ray) .

Ohtaki discloses wherein a diffraction optical element causes the first beam to be incident on the objective lens as a second order diffracted ray (Ohtaki, column 7, lines

45-60: note that Ohtaki's first and second beams are of the same wavelength as Shiono's), the diffraction optical element having highest diffraction efficiency for the second order diffracted ray of the first light beam (Ohtaki abstract).

Ohtaki teaches that this yields a higher diffracted efficiency than a zero order beam (Ohtaki, column 7, lines 45-60).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include in Shiono in view of Katayama wherein the diffraction optical element causes the first beam to be incident on the objective lens as a second order diffracted ray, the diffraction optical element having highest diffraction efficiency for the second order diffracted ray of the first light beam, as taught by Ohtaki.

The motivation would have been to have a higher diffraction efficiency, as taught by Ohtaki.

Regarding claim 24:

Ohtaki teaches wherein the diffraction optical element has diffraction efficiency of 90% or greater for the second order diffracted ray of the first light beam (Fig. 6; as the motivation for using Ohtaki is a higher diffracted efficiency, this is inherent to Shiono in view of Katayama and further in view of Ohtaki).

Allowable Subject Matter

14. Claims 25-26 and 32-34 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

15. The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 25-26:

The closest prior art of record is Shiono in view of Katayama, and further in view of Ohtaki, as applied to claim 23 above. In the closest prior art of record, all the beams are incident on the diffraction optical element as parallel rays. This element in combination with the other elements of the claim renders it allowable over the prior art of record.

Regarding claim 32:

The closest prior art of record is Shiono in view of Katayama, and further in view of Ohtaki, as applied to claim 23 above. Of these, Ohtaki does teach wherein the diffraction optical element includes a diverging diffracting face and a concave refracting face, as noted in the rejection of claim 14. However, the purpose of the concave refracted face taught by Ohtaki is to collimate the light emitted by the diffraction optical element, whereas this claim requires that this light be diverging for the second and third beams (as per the equations of claim 21). Ohtaki does not teach or suggest a concave refracting face that collimates some beams and not others, and thus this part of Ohtaki is not applicable when considering all the elements of the claim, and the combination of elements renders it allowable over the prior art of record.

Regarding claim 33:

The closest prior art of record is Shiono in view of Katayama, and further in view of Ohtaki, as applied to claim 23 above. Of these, an embodiment of Shiono does teach

wherein the diffraction optical element has a spherical refracted face (as per Fig. 10), but only under circumstances where the diffraction element is combined with the objective lens. As the claim implicitly requires the diffraction optical element and objective lens to be separate entities, this teaching does not apply, and the combination of elements in the claim renders it allowable over the prior art of record.

Regarding claim 34:

The closest prior art of record is Shiono in view of Katayama, and further in view of Ohtaki, as applied to claim 23 above, does not teach wherein the diffraction optical element has a refracting face whose power is not less than -0.1 for the first light beam. This element in combination with the other elements of the claim render it allowable over the prior art of record.

16. A statement as to the allowability of claims 27 and 28 has been withheld due the rejection under 35 U.S.C. 112, second paragraph.

Conclusion

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Arai et al. (US 6,870,805) and Komma et al. (US RE38,943 E) both provide a lengthy discussions of diffraction optical elements used for Applicant's purpose; Uchizaki et al. (US 6,728,193) discloses diverging beams incident on a diffraction optical element.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher R. Lamb whose telephone number is (572)

272-5264. The examiner can normally be reached on 8:30 AM to 6:00 PM Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Korzuch can be reached on (571) 272-7589. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

CRL 6/23/06



THANG V. TRAN
PRIMARY EXAMINER